BEDSIDE MEDICINE FOR BEDSIDE DOCTORS

An Open Forum for brief discussions of the workaday problems of the bedside doctor. Suggestions of subjects for discussions invited.

REFRACTION

I. PROBLEMS IN REFRACTION

A. RAY IRVINE, M.D. (727 West Seventh Street, Los Angeles).—It seems especially fitting to discuss this subject at this time. The so-called "eyesight specialists" and "eye-exercise experts," by means of the radio and newspapers, are constantly broadcasting to the innocent public the dire consequences of neglected eyestrain. Many of them promise to relieve all the troubles and prevent blindness and many diseases, by proper and newer methods of fitting glasses correctly. Others promise, by some sort of electric treatment and muscle exercises, to improve the eyes to the extent that glasses will no longer be necessary. We would be surprised to know how many thousands of people go to one class of advertisers and spend thousands of dollars to have glasses fitted, only to be disappointed and later go to replenish the coffers of the other class by having the glasses removed, and submit themselves to further pocketbook depletion by a series of expensive exercises and light treatments or what-nots. Errors of refraction do not cause any serious pathological conditions. Per contra, pathologic conditions do cause visual disturbances and asthenopic symptoms.

There are a great number of people with pathological conditions who will not be cured by fitting of glasses, and there are an equally great number of people with both pathology and errors of refraction, who should be diagnosed, treated and refracted properly. It seems logical, therefore, that all who have eye symptoms, or visual discomfort or disturbances, should consult a well-trained ophthalmologist in order that the former may not be overlooked or neglected. There are conscientious optometrists who are able to do accurate refractions, but do not recognize pathology. The general practitioner has a special responsibility in this matter, as he realizes the importance of early treatment of eye diseases, while the layman makes no distinction between oculist and optometrist, and often believes that a change of glasses will miraculously eliminate all his symptoms.

The taxpayers' burden to take care of the blind in this state is already in the millions and increasing rapidly. Alleviation of this burden can be attained by early recognition of the disease conditions which cause the blindness.

Visual disturbances may be caused by any of the following: glaucoma, acute and chronic; retinal exudates, hemorrhages, detachments, neoplasms; inflammatory conditions, including optic neuritis and edema of the nerve in intracranial disease; degenerative changes, anemias, diabetes, tuberculosis, syphilis, toxemias, arteriovascular changes in hypertensive disease, lens changes (cataracts and dislocations), pupillary membranes, congenital defects and birth injuries, hemianopsias and quadrant field defects, corneal changes (conus), muscle paresis, squints, etc. Since patients with these conditions often present themselves for refraction, some of the most important will be considered in the following paragraphs.

Of the children with manifest convergent strabismus only 50 per cent can be cured by glasses and exercises. The other 50 per cent can be cured by surgery alone, or surgery combined with exercises and correction of refractive errors. Often the squinting eye is found to be amblyopic, but the vision will improve if a proper correction is worn and the sound eye is occluded. In all these cases a cycloplegic is necessary for accurate examination.

Acquired phorias and squints occurring suddenly in older people may be due to cerebral accidents (hemorrhages). The annoying diplopia may be relieved by prisms in glasses. As the hemorrhages are absorbed, the prisms may be removed. Such patients should be completely examined by an internist.

Blurred vision which comes and goes, burning, fatigue, and sometimes ocular aches, due to accommodation and convergent difficulties, occur in toxemias and metabolic rate changes. When these are corrected, the symptoms disappear. Correction of refractive errors is important, but not sufficient to relieve the patient.

Aching eyes and headaches in frontal and temporal regions, with blurred vision, sometimes watery eyes without inflammatory signs, haloes seen around lights, should always require careful field charts and tension curves, as many early cases of glaucoma may thus be detected. Every oculist sees many such cases, where patients were fitted and refitted with glasses until serious pathologic changes have taken place. Chronic glaucoma is a very common disease and its early recognition is of prime importance to salvage vision and prevent blindness.

Patients come for glasses complaining of severe localized headaches, with nausea at times, dizziness, a feeling of unsteadiness, and a tendency to bump into things on one side. Glasses are changed frequently with no relief. A careful history, an exact perimetry study, fundus examination, and a neurological checkover and general examination, often reveal intracranial tumors. One such case, recalled by the author, revealed a meningioma of the olfactory groove producing pressure on the chiasm with optic nerve and field changes. The vision was restored after surgery. Many such cases are seen by the oculist.

Conical cornea is a condition which frequently occurs in comparatively young people. It may be

early detected by frequent changes in astigmatism and increase of myopia. Many times the first symptoms are blurred vision, with history of sudden onset. Keratometer readings are especially important in these cases, inasmuch as early corneal changes may here be easily recognized. Slit-lamp examination may show incipient thinning of the cornea, sometimes with apparent thickening of the corneal nerve fibers. Careful endocrine and metabolic studies should not be overlooked. Treatment other than glasses is indicated. In early cases of conical cornea it is usually possible to obtain useful vision by the use of a strong cylindrical or myopic correction. In more advanced cases of keratoconus, in which the ordinary lenses do not improve the vision, resort to contact lenses may be made.

Time and space will not permit further detailed discussion of the many pathological conditions to be discovered in patients presenting themselves for fitting of glasses.

Besides failure of visual acuity, symptoms accompanying refractive errors include all imaginable manifestations of eye discomfort, from the mildest to the most severe. Among the most common are momentary blurring of vision, doubling of images, annoyance or exhaustion in using the eyes for prolonged work. The eyes may feel tired, strained, hot or uncomfortable, or even painful. Low-grade infections, congestion of the lids and conjunctiva, may accompany eyestrain. Referred symptoms include headaches, dizziness, nausea and even indigestion.

Experience has shown that there is a complete lack of correlation between the number and kind of symptoms, and the number and degree of defects. Given two people with the same refractive error or muscle imbalance, one may have every symptom named above, while the other has none. Likewise, given any of the above symptoms reported by two individuals, one may have practical emmetropia while the other may show some refractive errors. Then, what are we to conclude in regard to asthenopia? First, that symptoms may or may not accompany refractive errors, depending upon the nervous state of the patient, and, second, that the symptoms reported are in no case an indication of what may be wrong.

As for the reasons for eyestrain, the strain comes from the effort to secure clear vision, and when the defect is such as to preclude correction, symptoms are not found. For example, gross errors of refraction and strabismus give less trouble than minor errors and phorias. A certain strain accompanies the dissociation of related functions, such as accommodation and convergence. The hyperope uses accommodation in excess of convergence, the myope uses convergence in excess of accommodation. In anisometropia the correcting effort is unequally distributed to the two eyes. In astigmatism the effort is irregular. Exophoria or deficient convergent power causes extra effort to secure clear binocular vision. Small amounts of hyperphoria are most difficult to correct and frequently cause severe symptoms.

Perfect emmetropia and orthophoria are rare. Small variations from these states are the rule, and minor errors of refraction when accompanied by good vision by no means require correction. Since refraction is an art as well as a science, the oculist must decide in each case what constitutes a minor error or what constitutes a moderate error of refraction. This depends upon the age, physical condition and nervous state of the patient. The neurasthenic patient is most subject to discomfort and suffers from the most numerous and unusual varieties of symptoms. Undoubtedly the largest percentage of asthenopias are due to psychoneuroses, to which the refractive errors are more or less secondary.

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II. HEADACHE AND REFRACTION

S. F. Boyle, M.D. (490 Post Street, San Francisco).—Ocular headaches are those related to the use of the eyes or resulting from disturbance of the physiology of the eyes.

Webb Weeks states that headache due to functional disorder of the visual apparatus is a reflex produced by stimulation of the nasal branch of the fifth cranial nerve, being reflected along other branches of this nerve. Changes in the eyeball are felt as pain in the brow along the branches of supraorbital nerve, and pain felt deep in the skull is reflected along the dural branches of the fifth nerve.

Felton assumes that the delicate network of sympathetic fibres surrounding the vessels in and about the eye, controlling the vasomotor tone, record pressure, edema, and hyperemia, associated with the presence of toxins from body waste, fatigue, perverted metabolism or other sources. These sympathetic fibres, by means of their intercranial connections and through vasomotor disturbances, may accentuate the headache reported by the fifth nerve and its branches.

In the midbrain the trigeminal establishes complex connections with the optic, the eighth and tenth nerves. Regarding the latter, Duke Elder believes that the vagal connections probably account for the cardiac and abdominal disturbances which accompany ocular disease such as glaucoma. Moreover, the low distribution of the ophthalmic division of the fifth nerve explains the frequency of the suboccipital headache in eye diseases, since the great occipital nerve reaches the same level in the cord as the first division of the fifth nerve.

The suboccipital headache of hyperphoria has also been explained on the basis of cervical muscle cramp, really minor degrees of head tilting in an effort to maintain single binocular vision more easily.

It is claimed that from 20 to 60 per cent of headaches are functional; and that 70 per cent or more of the patients who come to ophthalmologists complain of headaches in varying degrees.

Kirshner believes that an etiological lead may be had from the location of headache. He classifies the types of headaches according to their situation. He claims that frontal or supraorbital headache frequently indicates hyperopia; occipital headache points to muscle imbalance; temple pain

may mean astigmatism and frontotemporal pain in common in hyperopic astigmatism.

Michaelson's studies indicated that ciliary headache, that is, the headache caused by dysfunction or fatigue of the ciliary body in accommodating or focusing, is the same type of referred pain we find in angina pectoris and cardiac dysfunction.

Complete ophthalmic examination serves a negative function in that it rules out headaches that are not of ocular origin and is useful, at times, in discovering such conditions as glaucoma, optic atrophies, choked discs, hemianopsias and retinitis of albuminuric, diabetic or arteriosclerotic origin.

If the eyes must work against difficulties such as are seen in the hyperopic, or far-sighted person, the continued use of the eyes for near work frequently produces headache. This is especially seen in the presbyope who may tax the accommodative power beyond its natural reserve. The same holds true for the astigmatic patient and symptoms frequently arise in youth during the high school or college days if the eyes are used excessively for study. Although some of these patients will not accept a glass if refracted without drops, the use of a cycloplegic frequently discloses the presence of hyperopia or astigmatism.

Apart from the ciliary type of headache due to excessive accommodation or that caused by cramp of the accommodative apparatus, headaches may arise from impaired motility of the eyes or lack of easy coördination. The occipital headache of hyperphoria, vertical imbalance, has been mentioned, but poor convergence or even weak divergence can produce the sensations of eyestrain frequently manifest in the form of headache.

In convalescence from an illness or in any debilitated state the accommodation may be weakened and continued effort to read may produce headache that can readily be relieved by prescribing glasses. When general health of the patient improves the ciliary muscle regains its tone and the use of the glasses may be discontinued. A similar headache arises from overuse of the eyes combined with lack of outdoor exercise. There are limits of endurance even for an organism such as the ciliary body which, under normal conditions, has excellent reserve power. The headaches of ocular origin are, then, most frequently those associated with hyperopia, astigmatism, presbyopia or muscle imbalance. These can in almost every case be relieved by careful refraction and the prescribing of suitable lenses. There are other cases in which the refractive error may be partially responsible for the complaint of headache, and, although other causes of headache are eliminated, the patient may not be free from symptoms. It is in such cases that the correction of a small refractive error may be necessary before the headache can be completely relieved. A cycloplegic is especially indicated in such cases.

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III. REFRACTION VERSUS GENERAL HEALTH

Samuel V. Abraham, M.D. (3875 Wilshire Boulevard, Los Angeles).—A careful and detailed eye examination is essential to appreciate the part played by the eyes in the production or the exaggeration of any symptoms. In addition, the results of a thorough general examination should be available to the ophthalmologist. Only then can the physician properly stress the deserving factors, and avoid undue emphasis on minor or unrelated factors.

It is important for the eye physician to keep in mind that almost everybody will show an error of refraction when properly examined under cycloplegia.[1] * At birth, almost everyone is hyperopic, less than 1.0 per cent showing any myopia. As the age increases, there is a definite tendency for the hyperopia to decrease and the myopia to increase, along with an increase in the size of the eyeball. The relation of this tendency to the general growth factors is indicated by the gradual increase of the myopia during the growing years, so that by the age of 20, myopia found may be as high as 24.7 per cent. Repeated examinations in the same patients over a period of many years tend to confirm this relationship. This is especially true during the adolescent years. After the twentieth year, the change is ordinarily minimal.

Whether or not an individual will show a myopia as an adult depends not only on the growth factors, but to a considerable degree on heredity. Whether a child will show a high or a low degree of hyperopia or astigmatism depends greatly on the error of refraction in one or both parents. Naturally, the myopia due to normal growth processes will tend to be more frequent in those children who start with lower degrees of hyperopia. Myopia has been shown to be considerably more frequent in the offspring of parents when at least one of them is myopic. When both parents are myopic, the chances for myopia in the child are greatly increased.

The symptoms caused or exaggerated by errors of refraction differ somewhat with the error of refraction. They differ also with the various patients. The same patient may have different symptoms at different times, depending on his general health, occupation, and age. Where uncorrected hyperopia is a factor in the complaints, the symptoms may be headaches, chiefly frontal in character, and difficulty on near use of the eyes or at movies, especially if the patient is ill, or has recently been ill. If the condition remains uncorrected, there is a continuous drain on the nervous energy of the body, with resultant additional complaints of photophobia, tiredness, redness of the eyes, styes, general increased irritability, nervousness, insomnia, nausea, anorexia, malaise, and occasionally, blinking. The headaches may be so severe as to suggest even a brain tumor. In children the headaches may not be the prominent symptom. There may be lack of interest in school work, and psychic disturbances in addition to the above symptoms. In adults, too, psychoneurotic disturbances may be present. The accommodative muscle, being more active in the early years, permits the symptoms of eyestrain to be masked for long periods. It is therefore important,

* References will appear in the reprints.

particularly in young children, to do a cycloplegic examination in the presence of any complaints not explained by a thorough physical examination, and even in many of these, when the condition does not yield promptly to general care. It may be possible to help considerably by preserving energy being wasted because of an unsuspected amount of hyperopia. It should always be borne in mind that the psychological problems that may be introduced by the prescribing of glasses must be compensated for by a real need for these glasses. In a child under twelve years of age, for example, a hyperopia under 2.00 diopters may be wasteful of energy, but may still be unrelated to the complaints given. Unless there is evidence of a need for the help to be given by glasses, as in asthenic individuals, etc., 2.00 diopters of hyperopia should not be given major blame for any considerable trouble, in view of the 10 diopters or more of accommodation present in these years. When the amount of hyperopia is high, say over 5.00 diopters, the patient may not make a serious effort to overcome the defect. In these cases the visual acuity is frequently found to be subnormal. The early correction of these cases is imperative to prevent the influence that poor vision and eyestrain may have upon the development of the mind, and upon the general hygiene. The marked improvement in the mentality of these cases following correction of refraction has been demonstrated frequently.

The symptoms in myopia may be similar to those complained of in hyperopia, especially in early cases. However, in well established cases, the patient's chief complaint is one of poor distance vision. Near vision is good. The patient is frequently overstudious and of sedentary habits. The headaches when present are likely to be occipital or diffuse in character, and not definitely increased by near use of the eyes. There may also be increased photophobia, as the pupils may tend to be more sluggish in their responses. In the growing years there seems to be a definite relation to the general health. . . .

Correction by accommodation of the blurred vision caused by astigmatism is generally considered improbable. However, the constant effort to clear the vision when astigmatism is present, may lead to all the symptoms found in uncorrected hyperopia. The symptoms may be considerably exaggerated. Both distant and near vision may be unsatisfactory. There is frequently an attempt to decrease the size of the palpebral fissure (and thus the pupillary opening) as the blur is thus decreased. Any trauma to the cornea or lens of the eye, or any disease affecting the health of either, may cause a change in the refraction.

In keratoconus the astigmatism is usually irregular in character, becoming more so as the condition advances. Ordinary glasses do not give much help in these conditions. The wearing of contact glasses gives excellent improvement in vision. However, at best contact glasses are far from a desirable solution. . . .

As is well known, the power of accommodation naturally decreases with age. The ability to overcome uncorrected hyperopia becomes less, therefore, with age, and the amount of the error as well as the factors affecting the accommodative ability become increasingly important with age. This fact is of importance even in patients with low degrees of hyperopia or with emmetropia around the fortieth year, as at this time the amount of accommodation in reserve is usually insufficient to assure comfort in near use of the eyes over a prolonged period. (Presbyopia has arrived.)

General conditions, both functional and organic, may affect accommodation. Diphtheria may produce permanent or temporary loss of this function. Focal infections may be factors requiring attention. Local inflammations, due to diabetes, syphilis, tuberculosis, etc., may produce a spasm in accommodation and thus change the refraction of the eye. In some of these cases even atropin does not completely relax this spasm, as indicated objectively by the difficulty in maintaining a dilated pupil. Fatigue, acute or chronic illnesses, convalescence, psychic disturbances, excessive smoking, certain chemicals such as arsenic, etc., may lead to weakness in the activity of the accommodation. There may be an increased irritability of the ciliary muscle due to increased effort to use a weakened function. In the presence of a decreased ability of the ciliary muscle to function, whatever the cause, it becomes increasingly important to give greater attention to low errors of refraction (hyperopia). It may even be desirable to give premature aid to the accommodative function in near use of the eyes. Both these helps may be temporary, and may be found unnecessary when the general health factor responsible is removed. Symptoms of errors of refraction may be present in such cases even when no error is present. . . .

Under certain conditions, such as anisometropia, or antimetropia (in which there is a difference in the refraction of the two eyes), the fusional acts of the eyes are made more difficult, if not impossible. The extra strain involved varies considerably in the individual cases, and may be responsible for many and varied nervous disorders. . . .

The two problems, strabismus and amblyopia, while closely related to the subject of refraction and the general health, require extensive discussion. It is desired here to emphasize that proper and early attention to the refraction is important as a prophylactic measure in the prevention of these two conditions. Early correction of moderate and high errors of refraction is of considerable therapeutic value. In early cases, frequently, no further therapy is required. More important than the refraction in these cases is the general health factor. The frequency with which a parent relates the onset of the strabismus to the previous existence of an illness, emphasizes the importance of this factor. The disturbed progress in the development of a normal fusion, which may result from any weakening condition, is similar to the retardation in the development of other cerebration processes. When the error of refraction and the general health are both factors to be considered, the likelihood of a strabismus is increased. This probably accounts for an increase in the

frequency of higher errors of refraction (hyperopia) in the squinters than in the nonsquinters of the same age group. The neuropathic type of individual, in whom one sometimes sees a congenital nystagmus, may be given considerable help by proper early refraction. The high errors of refraction frequently found, together with the elimination of the nystagmus in some cases by glasses alone, justifies considering this mode of therapy at the first opportunity.

The error of refraction may be a considerable factor in determining the general physical and mental condition of the patient. The general physical and mental condition of the patient may be chiefly responsible for the symptoms, or for a precipitation of the symptoms given by the patient. It is not always easy to determine which is the major cause of the symptoms. . . .

Since the refraction findings depend to a considerable extent on the method of examination, it should be emphasized that only complete cycloplegia gives the basic findings. Any modification of the method is a compromise for practical reasons only. Any patient who requires a refraction deserves the most accurate one that we may be able to give him, even though the lack of accuracy may not be detected by the patient. Further, it is desired to point out that the so-called dangers of cycloplegics or mydriatics are far from real. A statistical study of more than 500,000 cases seen and examined with cycloplegics by fifty-one reputable eye men revealed that acute glaucoma may occur in less than 0.022 per cent of cases so treated in those over 30 years of age. Cases of patients under 30 occur with even greater infrequency. In the hands of competent eye physicians, the likelihood of any such complication is very slight, and when it does occur it may logically be interpreted as an indication of the existence of an early glaucoma which otherwise would probably have been neglected.

While no major harm may result from prescribing glasses after careful examination, and in fact some benefit may accrue to the patient from the saving of energy, the emphasis should be on the major trouble. An eye doctor must be more than a refractionist. He must be in a position to evaluate the refraction findings in the light of the complaints and the general findings—in short, he must above all be a physician. The patient must be treated as a patient, not simply as a pair of eyes!

Recent Progress in Treatment of Nervous Diseases Reviewed.—Some conception of the astonishing growth during recent years of specific and effective forms of treatment for diseases of the nervous system is contained in a review of modern methods of treating such diseases by Tracy J. Putnam, M. D., Boston, in *The Journal of the American Medical Association* for May 6.

Pointing out that it has not been many years since neurology was widely considered a purely diagnostic specialty, Doctor Putnam says that "one can look through the pages devoted to nervous diseases in almost any textbook of medicine written before the war and find scarcely a single suggestion of treatment beyond arsenic, strychnin, bromides and electricity, aside from the more obvious indications for surgery.

"It is perhaps natural that pain should be the symptom of disease of nerve tissue which earliest demanded and first received specific relief. The use of opium dates back to prehistoric days and no real substitute for it has ever been found."

From that early treatment of pain Doctor Putnam continues with outlines of some of the many advances made in the field of neurology, from operations interrupting the nerve pathways, their resection or surgical removal, on down to the injection of alcohol into the spinal column.

While scattered "cures" have followed the use of any one of a thousand different remedies for epilepsy, he points out, only a few measures have come to be accepted in modern practice. One of these is the use of bromides (heart and brain depressants). On the whole, the most successful treatment for the majority of patients suffering from convulsions of unknown origin is the use of phenobarbital (a drug having a sedative effect). The drugs at present in use for the treatment of convulsions all were primarily introduced as hypnotics (sleep-producers), and the discovery of their anticonvulsant effect has been rather accidental.

"The recognition of syphilis of the nervous system is a relatively modern feat," Doctor Putnam says. "It was doubtless treated with mercury even before it was recognized. According to F. H. Garrison, M. D., the identity of the man who first introduced mercury into therapeutics (treatment) is unknown. It is probable that, as far as neurosyphilis at least is concerned, its reign is almost over.

"The story of the introduction of arsphenamin by Paul Ehrlich in 1910 is familiar to all (his 605 formula which failed and number 606 which succeeded). As a treatment for neurosyphilis it has largely been replaced by a modification—tryparsamid, first prepared in 1917.

"The use of artificially induced fever in the treatment of neurosyphilis has a long history in the life of one man. Wagner von Jauregg apparently first noticed its effect in dementia paralytica (chronic syphilitic nerve disease of the brain) in 1887 but he dropped the subject and returned to it only during the war. His first brief paper specifically recommending the use of malaria was published in 1918. Since then the method has become a standard one.

"A few years later (1921) the use of bismuth was proposed by Sazerac and Levaditi. The salts of this metal have largely taken the place of those of mercury. Up to the close of the war, once neursyphilis was established, there was little hope of arresting its course. At present the majority of early cases can be cured."

Meningitis, next to syphilis, Doctor Putnam points out, is the most common form of infection of the nervous system. The value of spinal puncture in its treatment is not yet fully recognized. A specific antiserum for infections with the meningococcus was introduced by Jochmann in 1906. Although widely used, its value still is in some doubt. In the last two years, synthetic drugs of the type of sulfanilamide have become a standard treatment, which is amazingly effective not only against infections by the meningococcus but against other pyogenic (pus-producing) infections.

"An increasing number of diseases of the nervous system now are being recognized as due to vitamin deficiency," Doctor Putnam states. "Not only 'alcoholic' polyneuritis (inflammation of many nerves at once) but also the characteristic confabulatory (delusional) psychosis often associated with it appear to be due in part to a vitamin deficiency. How effective treatment of these conditions will be remains to be seen. The practical understanding and treatment of nervous and mental diseases still are in an expanding stage."

If you are working indoors all day, using your brain instead of your brawn, remember to take some form of active exercise outdoors every day to balance the indoor activity.—*Hygeia.*